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Gold-Bearing Gravels of Beauce County, Quebec.

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A SHORT time ago I paid a visit to the alluvial gold fields on the tributaries of the Chaudière River in Beauce County, Quebec, in company with A. O. Dufresne, late manager of the Champs d'Or Rigaud-Veaudreuil, and now Assistant to the Superintendent of Mines of the Province of Quebec. As the conditions under which the gold occurs in this district are not very generally known, and present some interesting features, a brief description of these conditions, and a consideration of the causes which gave rise to them, may be of interest to other mining engineers.

During the latter half of last century the country was visited by many mining engineers and geologists, and many references to it may be found in the reports of the Geological Survey of Canada between 1848 and 1911. The most important of these are by J. A. Dresser and J. Keele and the late Robert Chalmers. The Department of Colonization and Mines of the Province of Quebec also published a report with map on the district by J. Obalski.

From the earliest times the valley of the Chaudière River formed one of the main avenues of approach to the St. Lawrence in the vicinity of Quebec from the country to the south as far as the seaboard of the States of Maine and Massachusetts. The Indians had a well-known trail along the banks of the stream, and armed troops and foraging parties constantly moved backward and forward along it between Quebec and New England in those insecure times before the ceding of Canada to Great Britain.

Even yet the natural advantages of this old military route are recognized, and the government of the Province of Quebec has now under construction along it a magnificent highway from Quebec to the International Boundary Line, which is to form part of a through highway from that city to Boston.

The land along the valley is naturally well suited for agriculture, and about the end of the eighteenth and the beginning of the nineteenth centuries farmers began to go back from the St. Lawrence, and to occupy the higher lands along the upper portions of the Chaudière Valley. This settlement has gone on until now the country is peopled with a prosperous agricultural population.

Discovery of Gold

In 1823 or 1824, a woman first discovered gold in the Chaudière Valley near the mouth of Gilbert River. No attention was paid to the discovery, but in 1834 a young girl named Clothilde Gilbert, taking a horse to water, found in the creek, close to the location of the previous discovery, a nugget of gold weighing 14 dwt. Eleven years later the DeLery family, owners of the seigniory of Rigaud-Vaudreuil, obtained a patent from the Crown giving them exclusive privileges forever to mine the precious metals within their seigniory.

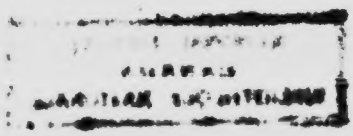
In 1847, the year before gold was discovered in California, the Chaudière Mining Co., which leased the mining rights from Mr. DeLery, mined gold on the Gilbert and Des Plantes rivers, and during the three following years continued to operate on the Gilbert River.

In 1851, the mining rights of the whole seigniory were leased to Dr. James Douglas and others of Quebec, who continued operations, chiefly on the Gilbert River, until 1864. After this date mining was prosecuted with more or less activity for about 30 years.

In all, up to the end of the century, about $2,600,000 worth of gold was extracted from the gravels of the Gilbert River valley, while it would seem that about $500,000 worth of gold was extracted from the gravel of the other tributaries of the Chaudière River.

Character of Country

That portion of the watershed of the Chaudière River and its tributaries, from whose buried gravels gold to the value of $2,500,000 has been extracted, extends for 20 miles in the direction of the valley, and 6 miles transverse to it, forming a block of land about 120 square miles in area, in which placer mining has been more or less systematically prosecuted. It lies in Beauce County, Quebec, 50 miles southeast of the city of Quebec, and 25 miles west of the International Boundary Line between Quebec and the State of Maine. The principal town is Beauceville, with 1,700 inhabitants, situated on both banks of the river at an elevation of 500 ft. above the sea, with hills rising to heights of 600 or 700 ft. both to the northeast and southwest of it. Transportation to or from the district is afforded by the Quebec Central Railway, which at the present time runs two passenger trains a day each way to and from Quebec. The railway runs up the valley of the Chaudière River through a number of small prosperous towns which are located on the bank of the stream, while back from the river the country is laid out in farms which are for the most part cleared of timber and in a good state of cultivation. Two wagon roads run up the valley, one on each side of the stream, and the method which has been generally adopted here, as elsewhere in Quebec, of surveying farms with a



narrow frontage on the river and a long extension back from it, permits the farmers to live moderately close to one another beside the main roads, giving these roads the appearance of long-extended scattered villages.

The country in which the gold-bearing district is situated is a dissected plain or tableland with a mean elevation of 1,000 or 1,100 ft. above the sea, lying between two old and greatly degraded mountain ranges.

These mountains are the northern extensions of the Green Mountains of Vermont and the White Mountains of New Hampshire. They run in two parallel chains about 50 miles apart northeastward from the International Boundary into the Gaspé Peninsula. The stronger chain, which has been called the Megantic Range, runs along the International Boundary Line, and some of its peaks rise to heights of 2,500 or 3,000 ft. above the sea. Some of the peaks of the other chain, known as the Sutton Range, rise as high as those farther to the southeast, but taken as a whole this range is the lower of the two.

Between these two ranges of mountains lies an extensive tableland which has been worn down by long-continued atmospheric erosion into rounded hills and wide valleys. The summits of the hills are covered with a thin mantle of glacial drift, while the lower slopes are rounded up by a thicker layer of the same unassorted material. In their native condition the hills were completely covered by magnificent forests of pine and maple, now largely cut down since the land has been brought under cultivation.

Drainage

The general direction of the drainage from this tableland is either northeastward or southwestward, parallel to the mountains. Nevertheless, it is trenched across, and the Sutton Mountains are cut through by the great transverse valley of the Chaudière, which collects the water from the many normal longitudinal streams, and carries it down into the St. Lawrence River. This valley has been cut deep into the old plateau and has reached a fairly mature condition, with gentle slopes descending from the high lands on both sides to the river, which has a moderate and fairly regular grade of about 8 ft. to the mile from the upper portion of the area under consideration to the St. Lawrence River. Such minor obstructions as do occur in the stream, as at the Devils' Rapids, have probably been caused by diversion of the river from its old channel by glacial agencies.

Structural Geology

The rocks that compose the Sutton and Megantic mountains are pre-Cambrian gneisses, and talcose, chloritic, and micaceous schists.

Between these mountain ranges, in the region of the Chaudière, the plateau country is underlain by green and reddish slates, quartzites, and

sandstones, which are stated by the officers of the Geological Survey of Canada to be of Cambrian and Cambro-Silurian age. In many cases these slates, etc., present a remarkable similarity to the pre-Cambrian slates and schists of Keewatin age in northern and western Ontario. Some of the slates are ordinary water-worn sediments, while others have recently been proved to be ash rocks, or similar rocks of igneous origin.

These rocks were deposited in a horizontal attitude in the seas of the Paleozoic era, but have been squeezed and crushed so that they are now generally steeply inclined or even vertical, and strike about N. 45° E., parallel with the mountain ranges.

Through the schists and slates, dikes and bosses of igneous rock, varying in character from peridotite to quartz-porphyry, have been injected. It is highly probable that some of the igneous rocks intercalated with the slates were injected into them as sills or laccolites before they were tilted and folded into their present attitude, but some of the dikes are doubtless subsequent to the folding. However, it is significant of the age of the igneous rocks associated with the gold-bearing gravels in the vicinity of Beauceville, that some of the green schists, associated with and included in the folding of the Cambro-Silurian rock in the valleys of Mill Creek and Chaudière River, were found to be volcanic rhyolite tuffs, while the igneous rocks in the vicinity are quartz-porphyries of similar composition, and probably of somewhat similar age.

Mr. Dresser[1] has already pointed out the similarity in character of these intrusives to those of the Stoke Mountain range farther west, which are associated with some of the most important copper properties in Quebec.

In the valley of Gilbert River, from which most gold has been collected, quartz-porphyries and acid intrusives, either sills or dikes, are particularly abundant. In the vicinity of many of the more acid intrusives quartz veins have been found to occur containing more or less gold associated with such sulphides as pyrite, chalcopyrite, and galena. These are all the hard rocks known to exist in the district under consideration, and such sediments as overlie them consist of unconsolidated material of very much younger age.

The oldest of the later sediments consist of thin beds of stratified gravel extending down the bottoms of the valleys, but of no considerable lateral extent. In places they contain grains and nuggets of gold. Overlying these gravels is a varying thickness, sometimes as much as 100 ft., of unassorted and unstratified boulder clay. Other and later sands and gravels also occur in gorges in the bottoms of the valleys, which also contain a small quantity of gold. Overlying these is a second thickness of boulder clay. Finally there is gravel in the bottoms of the present streams.

[1] J. A. Dresser: The Bedrock of the Gilbert River Gold-fields, Quebec. *Journal of the Canadian Mining Institute*, vol. viii, pp. 259 to 262 (1905).

Historical Geology

The sequence of events which led up to the formation of these buried gold-bearing gravel deposits was about as follows:

After both the igneous and sedimentary rocks of early Paleozoic and pre-Paleozoic times had been formed or deposited and had been intensely crushed and folded into what must have been a range of mountains, they appear to have been intruded by dikes of the following igneous rocks: Peridotite, pyroxenite, gabbro and diabase, granite, quartz-porphyry, etc.

Subsequent to these intrusions, probably to the last of them, the rocks were again subjected to heavy strains, so that they were still further fractured. Into some of the more acid of the igneous rocks (whether dikes or sills is not always certain), siliceous waters carrying sulphides of iron and copper, with native gold, were introduced along the fractures, also from these fractures the gold-bearing solutions seeped out into the adjoining rocks, forming quartz veins and pyritized zones carrying a smaller or larger percentage of gold. Thus the veins were formed from which the grains and nuggets of gold found in the valley gravels have undoubtedly been derived.

Toward the close of the Paleozoic era, and after the rocks had assumed a fairly stable condition, the whole country was raised above the level of the sea, and since that time it would appear to have remained above sea level, and to have been exposed constantly to the influence of atmospheric and stream erosion and denudation. During this vast period of time, extending from the end of the Paleozoic era to the present, an enormous thickness of rock was undoubtedly removed from the general surface, and as the softer rocks would be worn away faster than the harder ones, the latter remained as higher points and ridges.

At first the water which drained from the district would flow downward to the sea over the lowest parts of the surface, irrespective of the hardness of the rocks of which this surface was composed, and water courses so begun might persist to the present. The great valley of the Chaudière is probably such a persistent water course, while the smaller streams have been cut off from their direct connection with the sea, and have been obliged to become tributary to the Chaudière, their courses being finally det rmined by the varying characters of the underlying rock.

While the surface was being decomposed through the agencies of air and moisture, with the help of plants and animals, the decomposed rock was constantly being carried downward by the rills and streams, and at the same time was being assorted into heavier and lighter portions. In this process the coarser and heavier portions constantly lagged behind and became entrapped by the inequalities of the underlying rock, while the smaller and lighter portions were carried down into the main channel of the Chaudière River, and thence into the sea.

In this way, during the long period which intervened between the up-

lift near the close of the Paleozoic era and the beginning of the Pleistocene period, the country was worn down, possibly from a high range of mountains, to a fairly mature physiographic relief, in which rocky cliffs and gorges were unknown, and the slopes of the hills were everywhere gentle, with coverings of decomposed residual rock. Also in the bottoms of the wide valleys the streams flowed with gentle regular current without rapids or waterfalls. In and beside these streams were deposits of sand and gravel which undoubtedly contained most of the heavy minerals that had been washed down from the adjoining hills during the whole period of their long-continued erosion, unless these minerals had been carried away in solution, or were in a sufficiently fine state of division to have been transported to the sea with the lighter sediments. Of these heavy minerals the most important, and at the same time the most persistent, was gold.

The general relief of the country at the beginning of the Pleistocene period would have been very much like that of the Klondike district, in Yukon Territory, at present, particularly those parts of the Klondike drained by Dominion Creek and Indian River, where later gorges have not been developed; with this difference, that the Quebec slopes were easier and the whole topography was more mature.

Another point of similarity between the two districts is, that throughout the whole time when active erosion was in progress the drainage of the country was local and the whole of the gravel concentrated in the bottom of any valley was derived from that particular valley or its tributaries, and not from a foreign valley.

Again, the gravel in the bottom of a valley was the ultimate concentrate from the vast quantity of material which had been eroded from that valley, possibly aggregating many cubic miles of rock, and consequently if the gravel was rich in gold it was due to the quantity of rock concentrated, rather than to the original high gold tenor of the rock.[2]

At the beginning of the Pleistocene period there was a break in the continuous course of atmospheric and stream erosion which had been in progress throughout the Mesozoic and Tertiary epochs, for snow and ice began to collect in great quantity on the Adirondack Mountains to the south, and from this center or gathering ground the ice moved northwestward down the valley of the Chaudière River, across the hills which flank it on both sides, and over the valleys of the tributaries which flow into it approximately at right angles to its course, until it stopped in the vicinity of the south bank of the St. Lawrence River.[3]

[2] Cf. The Gold of the Klondike, by J. B. Tyrrell, *Transactions of the Royal Society of Canada*, vol. vi, New Series, Sect. 4, pp. 29 to 59 (1912), and The Law of the Pay-streak in Placer Deposits, by J. B. Tyrrell, *Transactions of the Institution of Mining and Metallurgy*, vol. xxi, pp. 593 to 613 (1912).

[3] For detailed evidence of the succession of events during the Glacial Period the reader is referred to Robert Chalmers's Report on the Surface Geology and Auriferous Deposits of South-Eastern Quebec, *Annual Report of the Geological Survey of Canada*, vol. x, New Series (1897).

From the standpoint of the miner engaged in the exploitation of alluvial gold-bearing deposits, this first ice invasion from the south is of great interest, for, inasmuch as it moved down the Chaudière Valley, where this valley runs northwestward, it doubtless removed any stratified sand and gravel which may have been in the bottom of those portions of the valley so oriented, and at the same time it rounded up the sides of the valley, and filled in the mouths of the lateral valleys with débris collected from the valley itself or from the sides of the adjoining hills. During its later waning stages it probably also left lateral moraines on both sides of the valley.

When at its greatest extent, this Adirondack glacier covered the higher lands and moved over the valleys of the tributaries of the Chaudière River which were transverse to its general course. In these cases it moved the decomposed rock from the summits and the south sides of the ridges down into the valleys and covered the gravel, which had previously been deposited there, with a coating of boulder clay or till.

In most cases, as in the valley of the Gilbert River, the glacier had lost the greater part of its pushing power when it reached the lower levels, so that it left the gravels undisturbed and merely covered them with its heavy coating of dirt brought from above. In some few cases, as in some places on the banks of Meules Creek, there was still a little vertical energy left in the glacier when it reached the bottom of the valley, and so it kneaded up the sand and gravel into a compact unstratified mass of water-worn material a few feet in thickness before covering it with unassorted till.

While this northwestward moving glacier pushed a certain quantity of loose unassorted material into these smaller transverse valleys it did not fill them, but deposited its load on their southern slopes, and consequently when it retired it left the new bottoms of these valleys farther north than they were before, while the old pre-glacial gravels in the original bottoms of the valleys were buried under the talus of rock débris to the south.

When the Adirondack ice withdrew from the country at the close of the first glacial period, the brooks and rivers flowed in the same valleys which they had occupied before the ice invasion, but as the bottoms of the transverse valleys had been moved toward the northwest the streams naturally adopted the lowest parts of the valleys, and therefore now flowed in channels northwest of their former channels, and usually at somewhat higher elevation; at the same time they were cut off from the main Chaudière Valley by the ridges or lateral moraines which had been piled up along its sides. Consequently, in their endeavor to reach the main stream, the lateral brooks cut new gorges in the bottoms of the valleys northwest of the old channels, but their sides remained steep, for the period during which the country was free from ice does not appear to have been

sufficiently long to have permitted of the grading of the sides of these second gorges to gradual slopes. One of these interglacial gorges has been outlined by shafts and drill holes on the northwest side of Meules Creek.

After the deep, narrow, interglacial gorges had been formed the country was again, and probably more deeply, covered with ice, but on this occasion the ice accumulated on the Laurentian hills north of the St. Lawrence and then moved southward and southeastward across the St. Lawrence River and up the long slope south of it for about 100 miles almost to the summit of the Megantic range of mountains on the International Boundary Line. This second invasion of ice therefore moved up the valley of the Chaudière River in the opposite direction to that in which it had moved on the former occasion. Again it scored out and smoothed off the bottom and sides of the main valley. Also, as it passed over the valleys tributary to the main valley, and at right angles to its course, it pushed such decomposed and broken rock as it was able to collect down into these valleys, covering their northern sides with débris and filling

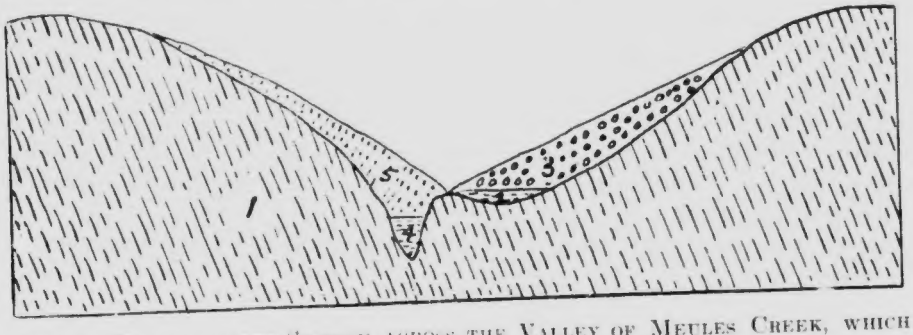


FIG. 1.—DIAGRAMMATIC SECTION ACROSS THE VALLEY OF MEULES CREEK, WHICH FLOWS NORTHEASTWARD INTO THE CHAUDIERE RIVER.

1. Paleozoic slate.
2. Pre-glacial gold-bearing gravel.
3. Boulder clay of the Adirondack glacier from the southeast.
4. Interglacial sand and gravel.
5. Boulder clay of the Laurentian glacier from the northwest.

in and covering up the interglacial gorges which had recently been cut in them, but it did not completely fill the valleys with boulder clay, so that when this glacier in its turn melted away and disappeared, and open streams again began to drain the country, they flowed in channels independent of either of the earlier channels, and in some cases at least, intermediate between them. (See Fig. 1.)

Since the close of the last glacial period, when the ice finally retired from the country and left it in much the same condition as it is at the present time, the streams in the transverse valleys are again cutting new channels for themselves in the bottoms of the valleys through the covering of boulder clay and down into the underlying rock on lines independent of the earlier channels.

A striking feature of the new system of drainage which prevails in the country at the present time is that the lateral streams discharge into the main valley of the Chaudière over rapids or waterfalls from "hanging valleys." This condition indicates clearly that the lower parts of these lateral streams are not now occupying their old pre-glacial or interglacial channels. In no case was I able to learn of either one or the other of the old channels having been traced all the way down into the Chaudière channel.

When the ice had finally retired it left the whole country, both hills and valleys, covered with a sheet of glacial drift. On the hills this sheet is usually thin, while in some parts of the valleys it may reach a thickness of 100 ft.

This sketch of the causes which led to the formation of the beds of gold-bearing alluvial gravels, and of the methods which Nature adopted in giving them their present characteristics, and in hiding them in their present obscure locations, may be summarized as follows:

Summary of Gold Conditions

1. Gold was probably introduced into the folded Paleozoic rocks subsequent to, but in close association with, sills or dikes of acid rocks, such as quartz or granite-porphyry.

2. It was introduced along with pyrite and other sulphides in siliceous water which formed quartz veins in or near these dikes, etc.

3. Toward the close of the Paleozoic Era the country was raised above the level of the sea, and has remained above the sea until the present time.

4. Throughout the most of this immensely long period, until the beginning of the Pleistocene period, it was constantly suffering erosion from atmospheric and stream agencies, and it was worn down to a fairly mature condition with gently sloping hills and wide valleys.

5. Where gold occurred in these hills it had been washed down through countless ages into the bottoms of the valleys, and was concentrated in the alluvial gravels beneath and beside the streams.

Many streams throughout northern Canada which flowed over gold-bearing rocks must also have had gold-bearing gravel in their beds in pre-glacial times. In most cases, however, the subsequent glaciation was sufficiently severe to have carried away all this gravel, while in the Chaudière district the glaciation was less severe, and some of the gravel was left in place.

6. After this long period of erosion and concentration a great glacier formed on the summit of the Adirondack Mountains and moved northwestward over the country toward the St. Lawrence River. On its way it crossed the valleys which lay transverse to its course, and buried some of the gravel which lay in the bottoms of those valleys under a heavy

mantle of boulder clay. Sometimes the gravel was left quite undisturbed in its original condition, sometimes it was kneaded together so that its stratified character was obliterated. It is chiefly from these pre-glacial beds of gravel that gold has been extracted.

As the glacier moved directly down the Chaudière valley it probably scored out most, if not all, of the gravel which had accumulated in it, though up to the present time this question does not appear to have been definitely settled, for the bottom of the valley has not been thoroughly prospected either by shafts or drill holes. At one place, namely at Devils' Rapids, gold has been found in the Chaudière River, but here the stream is flowing for a short distance transverse to the general direction of the valley and the course of glaciation.

7. After the Adirondack glacier had retired, new and narrow channels were cut by the transverse streams in the bottoms of the transverse valleys, to the north of the old pre-glacial channels. These contain a small quantity of gold, but the interglacial period was not sufficiently long to permit of the concentration of much gold in them, so that except where they may possibly have cut into or across the earlier pre-glacial channels they have not proved, and are not likely to prove, rich in gold content.

Up to the present time interglacial channels do not appear to have been distinguished from pre-glacial ones, and doubtless some of the failures which have occurred in the district have been caused by expending time and energy on the buried, but poor, interglacial channels, under the impression that they were the rich pre-glacial channels.

8. After the interglacial channels were formed another glacier advanced across the country from the northwest and buried these channels under another and later sheet of boulder clay.

9. When this glacier retired from the country the streams began to cut out their present channels, which are independent of the two former sets, but as yet no large quantity of gold has been concentrated into these new channels.

Whether all the buried gold-bearing gravels have been discovered or not will not be discussed here, but it may be pointed out that the pre-glacial channels of the lateral streams, which in their upper courses are gold-bearing, do not appear in a single case to have been traced down to their junctions with the main valley of the Chaudière River, though it is reasonably certain, from the mature character of the topography throughout the country, that such channels are continuous without falls or interruptions from the lateral valleys into the main valley.

Character of Bedrock

The bedrock underlying the pre-glacial gold-bearing gravels consists chiefly of green and gray chloritic and quartzitic slates striking N. 45° E.

and dipping southeastward at an angle of 70° or steeper. Where these slates are overlain by pre-glacial gravels they are rough and uneven and form excellent natural riffles, so that the gold was collected either in the inequalities of their surface, or immediately above them, and they have not been smoothed and polished by glacial agencies like the rocks of the adjoining hills.

On the Gilbert River and in other localities these slates were intruded by sills or dikes of quartz-porphyry, and these sills or dikes occur at places which are said to have been the most productive in the whole area; but in the absence of personal observation of the old mines it is impossible for me to say what effect the character of this bedrock had on the pay streak in the old channels.

Character of Gold

The gold obtained from the gravels of the tributaries of the Chaudière River is mostly such as is usually known to placer miners as coarse gold, very little of it being in the form of very minute flakes or particles. There can be little doubt but that fine gold existed in the veins from which the placer gold was originally derived, but if it did it was carried farther down the streams and much of it was probably deposited in the gravels of the Chaudière River. One nugget was found on the Gilbert River which weighed 51 oz., 18 dwt., 6 grains, another weighed 45 oz., 12 dwt., while another nugget found on the same river weighed 42 oz.

Last summer Louis Matthieu recovered 50 oz. of gold from the gravels of Meules Creek, all of which was quite coarse and granular. The largest nugget weighed between 2 and 3 oz., while the next largest, which I obtained, weighed 24 dwt., 12 grains.

Mr. Obalski gives the fineness of two samples of gold as 874 and 879, equal to a value of $18.06 to $18.15, and these may be considered as representing the average fineness of the gold of the district.

Methods of Mining

In the earliest days of mining in the district the gravel was collected from the bars in the river, probably where the river crossed or cut into one of the old channels, and was washed in a gold pan or in a cradle or rocker to recover the gold.

Afterward some parts of the pre-glacial channels were discovered which were covered with but thin layers of boulder clay. The boulder clay was thrown to one side, and the underlying gravel was shoveled from the open pits into sluice boxes, supplied with water from higher up the river, and the gold was collected in the boxes.

At a later period the rich gravels were found under a heavy over-

burden of boulder clay, in places 60 or 70 ft. thick. In some cases this buried gravel was reached by tunnels driven into the sides of the hills, and in other cases by vertical shafts sunk to it. From the ends of the tunnels and from the bottoms of the shafts as much of the gravel and underlying bedrock as contained gold was mined and brought to the surface, where it was washed in sluice boxes as before, and the gold extracted.

Four or five years ago a much more ambitious plant was installed on Meules Creek. A ditch 7 miles long was dug from Lake Fortin, at the head of Mill Creek, in which water was conducted to a penstock on the high ground south of Meules Creek. Thence it was conducted in a pipe to a point on Meules Creek where hydraulic operations had been determined upon, the head of the water at this point being 260 ft. Here one or more hydraulic giants were installed and through them the water was projected against the south side of the valley, and the gravel and débris were washed down and run through a sluice to collect the gold. At the tail of the sluice a bucket elevator picked up the tailings and stacked them lower down the valley. Unfortunately, the operations do not appear to have been financially successful, for the bank which it was proposed to wash down proved to consist of boulder clay with but a thin layer of re-assorted pre-glacial material beneath it, which was not sufficiently rich to compensate for the poverty of the boulder clay above. The plant has not been in operation for the past two summers.

During the past summer a few tributers or laymen were working in a small way "shoveling in" on Meules Creek, with the result stated at the beginning of this paper, but mining work appears to have ceased on Gilbert, Des Plantes, and other streams in the vicinity some years ago.